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09/442,671	11/18/1999	Elzbieta Janina Haftek	SEA8974/30874.84USU1	6244

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EXAMINER
DOLAN, JENNIFER M

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/442,671	HAFTEK, ELZBIETA JANINA	
	Examin r	Art Unit	
	Jennifer M. Dolan	2813	

-- The MAILING DATE of this communication appears n the cover sheet with the corresp ndence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 6, 9, 11, 12, and 16-18 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 5,734.533 to Nepela.

Regarding claim 1, Nepela discloses a magnetic transducer device comprising: a bottom magnetic pole (P1), a nonmagnetic gap layer (14, 37) deposited over the bottom magnetic pole (figure 1); and a top magnetic pole (P2) deposited over the nonmagnetic gap layer (figure 1). The top magnetic pole has an upper portion (top portion of P2) and a lower portion (bottom portion of P2, including the lower projected end regions), wherein the lower portion of the top magnetic pole faces the surface of the bottom magnetic pole (figure 1). The lower portion has a middle section (portion of P2 directly over 37) that is separated from the bottom pole by the nonmagnetic gap layer by a first distance (Tc), and the lower portion has end portions (portions of P2 projecting downward at ends of P2, located approximately near 16 and 18 in figures 1 and 2) located at each end of the middle portion that are separated from the bottom pole by a nonmagnetic gap layer (figure 2) by a second distance (Ts). Nepela further discloses an exemplary embodiment in which the second distance is about 25%, which suggests that the embodiment encompasses a range of slightly less than 25% to slightly greater than 25% (column 4, lines 1-5). Assuming arguendo, the second distance is not considered to be greater than 25%.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the distances of Nepela, such that the second distance is greater than 25% of the first distance. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide a second distance greater than 25% of the first distance in order to optimize side fringe fields, side-writing, and pulse asymmetry (see Nepela, column 1, lines 58-64). Nepela further suggests that the first and second distances are chosen such that the magnetic field delivered across the central portion of the gap is larger than the coercivity of a magnetic medium, and thus able to write transitions on the medium, while the magnetic field delivered across the side portions is smaller than the coercivity, and thus will not write transitions on the medium (see column 4, lines 1-15 and figure 3). From figure 3 of Nepela, it is apparent that a wide variety of ratios of the first gap distance to the second gap distance will adequately meet the conditions listed supra. Although the full range of distances are not specified in Nepela, it would have been obvious to specify that the second distance is at least 40%, 50%, or 60% of the first distance in order to optimize the magnetic field properties delivered to an adjacent recording medium, because it has been held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

Regarding claim 6, Nepela teaches that the width measured between a left and a right side of the top magnetic pole ranges from approximately 1.08 to 6.5 microns (column 3, lines 57-60), which overlaps with the range of 0.3 to 1.5 microns.

Regarding claim 9, Nepela discloses a first distance of about 0.2 microns (column 4, lines 1-2).

Regarding claim 11, Nepela discloses that the end portions each have a surface that is substantially parallel with the surface of the bottom magnetic pole (figure 1).

Regarding claim 12, Nepela discloses that the end portions are substantially square in shape (figure 2).

Regarding claim 16, Nepela discloses that each end portion is defined by a segment connecting two points (figure 2).

Regarding claim 17, Nepela discloses that the segment is linear (figure 2).

Regarding claim 18, Nepela discloses a curvilinear segment (column 4, lines 23-26).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-5, 7, 8, 10, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nepela.

Regarding claims 2-5, Nepela discloses an exemplary embodiment of the head, with dimensions such that the second distance of the gap layer is approximately equal to 25% of the first distance (column 4, lines 1-5), but does not specify that the gap dimensions are limited to those of the exemplary embodiment. The magnetic head of Nepela is considered to have a

second distance of at least 40%, 50%, or 60% of the first distance, or, alternatively to have a distance ranging from 25%-60% of the first distance. Assuming arguendo, the second distance of Nepela is not at least 40%, 50%, or 60%, or between greater than 25%-60% of the first distance.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the dimension of the second distance of the gap layer, of Nepela, such that it is at least 40%, 50%, or 60%, or such that it is between greater than 25%-60% of the first distance. The rationale is as follows: A person having ordinary skill in the art would have been motivated to specify a second distance as claimed, distance in order to optimize side fringe fields, side-writing, and pulse asymmetry (see Nepela, column 1, lines 58-64). Nepela further suggests that the first and second distances are chosen such that the magnetic field delivered across the central portion of the gap is larger than the coercivity of a magnetic medium, and thus able to write transitions on the medium, while the magnetic field delivered across the side portions is smaller than the coercivity, and thus will not write transitions on the medium (see column 4, lines 1-15 and figure 3). From figure 3 of Nepela, it is apparent that a wide variety of ratios of the first gap distance to the second gap distance will adequately meet the conditions listed supra. Although the full range of distances are not specified in Nepela, it would have been obvious to specify that the second distance is at least 40%, 50%, or 60% of the first distance in order to optimize the magnetic field properties delivered to an adjacent recording medium, because it has been held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

Regarding claim 7, Nepela discloses that an exemplary value of the width of the device is approximately 1 micron (column 3, lines 57-60), but fails to teach all considered ranges of width for this device. Assuming arguendo, the width of Nepela is not in the range of 0.3 to 0.5 microns.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify a width of 0.3 to 0.5 microns for the magnetic head of Nepela. The rationale is as follows: It is well known in the art that track density increases as the width of the pole tip decreases. It is likewise well known in the art that as the width of the pole tip decreases, fringe fields, which increase side writing, as well as pulse asymmetry, become more pronounced. It is well within the purview of one of ordinary skill in the art to select values for the width of the pole tip such that the track width is as small as possible, while maintaining the fringe field effects within reasonable parameters. Although a width of 0.3 to 0.5 microns is not disclosed in Nepela, it would have been obvious to specify a width of approximately 0.3 to 0.5 microns in order to optimize the track width and fringe field effects of the device, because it has been held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

Regarding claim 8, Nepela discloses in an exemplary embodiment that the first distance is about 20% of the width of the device (column 4, line 2 and column 3, lines 57-60), but fails to disclose all of the ranges of dimensions for the features of this device. The device of Nepela is considered to have dimensional ranges such that the first distance is about 30% of the width. Assuming arguendo, the first distance of Nepela is not about 30% of the width of the device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the first distance is about 30% of the width of Nepela's device. The motivation for this is as follows: In a thin film head, the first distance, which corresponds to the write gap, is selected to control the strength of the magnetic field between the poles, and is typically about 0.2 microns. Although Nepela discloses an exemplary width of about 1 micron (column 3, lines 57-60), it is clear that a smaller width could be specified in order to optimize track width and fringe field effects. Although Nepela does not disclose the exact distances, it has been held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

Regarding claim 10, Nepela discloses in an exemplary embodiment that the first distance of the gap layer is 0.2 microns (column 4, lines 1-2), but fails to disclose the range of thickness for the first distance considered in this device. Nepela's device is considered to also include a first distance of 0.15 microns. Assuming arguendo, Nepela's device does not have a width in the range of 0.1 to 0.15 microns.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify a first distance in the range of 0.1 to 0.15 microns for the device of Nepela. The rationale is as follows: A decrease in the first distance leads to an increase in the magnetic field delivered to the recording medium. In order to record on the magnetic medium, the field delivered to the recording medium must be greater than the coercivity of the recording medium (column 4, lines 6-15). Thus, it would have been obvious to one of ordinary skill in the art to select a first distance in the range of 0.1 to 0.15 microns, such that the magnetic field delivered is

sufficient to record transitions on the recording medium. Although Nepela does not specifically disclose a first distance in the range of 0.1 to 0.15 microns, it has been held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

Regarding claims 19 and 20, Nepela discloses that the end regions have an arcuate configuration (column 4, lines 23-26), but does not specifically disclose whether the arcuate configuration is convex or concave with respect to the bottom magnetic pole.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the arcuate configuration of Nepela constitutes both convex and concave configurations. The motivation is as follows: An arcuate configuration of the end gap implicitly means that a segment drawn along the end region would be either convex or concave with respect to the bottom magnetic pole. Because Nepela teaches that a single step, multiple steps, or arcuate configurations for the end regions are art equivalents and may alternately be used (column 4, lines 23-26), it is clear that both the convex and concave arcuate configurations are considered art equivalents to the single step end region. Thus, it is well within the purview of one of ordinary skill in the art to select both the convex and concave configurations for the end regions.

5. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nepela in view of U.S. Patent No 5,483,403 to Voegeli.

Regarding claim 13, Nepela discloses prior art end portions that are wedge shaped (column 1, lines 36 – 50). Nepela further discloses that the side gaps, and hence the end portions, may be formed in a multiple stepped configuration or an arcuate configuration (column 4, lines 15 – 26). A wedge-shaped end portion is considered to be within the scope of Nepela's invention, because Nepela shows that the particular shape of the end portion is not critical, providing that the side gap is smaller than the central gap (see column 2, lines 3-16 and column 4, lines 15-26), and because a wedge shape is substantially similar to a multiple-stepped configuration with a large number of steps. Assuming arguendo, Nepela does not suggest a wedge shaped end portion.

Voegeli discloses a magnetic structure with two magnetic layers sandwiching a gap layer, wherein the end portions are wedge shaped (figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nepela so that the end portions are wedge shaped, as taught by Voegeli. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide wedge shaped end portions, because Nepela cites a problem of large fringe fields emanating from the sides of the gap (Nepela, column 1, lines 32-36), and Voegeli teaches that by forming wedge shaped end regions of magnetic layers surrounding a gap, the magnetic fields, and thus the fringing fields, at the edges of the structure are significantly decreased (see Voegeli, column, 5, lines 1-32).

Regarding claims 14 and 15, Nepela discloses that the end portions have a surface that faces the surface of the bottom magnetic pole (figures 1 and 2). Nepela discloses that the side gaps, and hence the end portions, may be formed in a multiple stepped configuration or an

arcuate configuration (column 4, lines 15 – 26). An angled end portion, such that the distance between the end portion and the bottom magnetic pole is greater at one end than at an opposite end of the end portion, is considered to be within the scope of Nepela's invention, because Nepela shows that the particular shape of the end portion is not critical, providing that the side gap is smaller than the central gap (see column 2, lines 3-16 and column 4, lines 15-26), and because an angled end-portion is substantially similar to a multiple-stepped configuration with a large number of steps. Assuming arguendo, Nepela does not suggest an angled end portion.

Voegeli discloses a magnetic structure with two magnetic layers sandwiching a gap layer, wherein the end portions (angled part of 115 at each side of 115) are angled so that at one end of the end portion, the distance between the end portion and the bottom magnetic pole is greater than at an opposite end (figure 6). Voegeli further discloses that the distance is greatest between the end portions and the bottom magnetic layer at the end portion closest to the middle portion of the top magnetic layer (see figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nepela so that the end portions are angled, as taught by Voegeli. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide angled end portions, because Nepela cites a problem of large fringe fields emanating from the sides of the gap (Nepela, column 1, lines 32-36), and Voegeli teaches that by forming angled end regions of magnetic layers surrounding a gap, the magnetic fields, and thus the fringing fields, at the edges of the structure are significantly decreased (see Voegeli, column, 5, lines 1-32). It further would have been obvious to arrange the angled end regions such that the distance between the end portion and bottom magnetic pole is greatest at

the portion closest to the middle portion of the top pole, because the gap needs to be largest near the center and smallest at the edges for the structure taught by Voegeli to provide the desired decrease in magnetic fields and fluxes at the edges of the structure (see Voegeli, column 5, lines 1-32; figures 5 and 6).

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nepela in view of U.S. Patent No. 6,169,642 to Mino et al.

Nepela fails to disclose that the bottom magnetic pole (P1) comprises a shared pole, a magnetic layer deposited on the shared pole wherein the magnetic layer has a width equal to the width of the device, and a nonmagnetic region deposited on the shared pole at each end of the magnetic region.

Mino et al. teach that the bottom magnetic layer comprises a shared pole (column 10, lines 6-11), a magnetic layer (44) deposited on the shared pole (figure 4), and a nonmagnetic layer (47) deposited on the shared pole (figure 4) at each end of the magnetic region. The width of the magnetic layer is clearly equal to the width of the top of the top pole (48), which is considered to be the width of the device.

It would have been obvious to one of ordinary skill at the time the invention was made to modify the magnetic transducer of Nepela to include the bottom magnetic layer structure taught by Mino et al. The modification would have been obvious because Mino et al. teach that it increases heat dispersion from the coil conductor, which prevents generation of heat from a magnetic head (Mino, column 3, lines 15-24).

Response to Arguments

7. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new grounds of rejection.

Insofar as any arguments can be applied against the new grounds of rejection, the Applicant's arguments for claim 1 are not persuasive. The Applicant argues that Nepela does not disclose or suggest modifying the gap dimensions such that the second distance is greater than 25%, 40%, 50%, or 60% of the first distance. The Applicant further argues that In re Aller is not applicable to the present case.

This is not persuasive, because Nepela is considered to essentially disclose a gap dimension of greater than 25%, since by specifying that the gap distance is *about* 25%, Nepela is disclosing a small range of values near 25%. Furthermore, since the material depositions required to produce the device cannot be controlled to exact dimensions, the devices of Nepela will implicitly include gaps of slightly lower than 25% to slightly greater than 25%. Nepela is, however, only disclosing a gap of 25% as an exemplary embodiment. Since Nepela shows that the dimensions are picked such that the central gap has a field strength higher than the coercivity of record medium, the side gaps have a field strength lower than the coercivity of the medium, and that problems relating to side fringe fields, side-writing, and pulse asymmetry are being addressed and optimized in the device of Nepela, it is reasonable and not unobvious to select any gap dimensions which meet the field strength requirements and address the side fringe field, side-writing, and pulse asymmetry problems. In re Aller would appear to be applicable to this situation, as there is only a statement of values for gap dimensions in the specification of the present application, but there is no suggestion of criticality or unexpected/unobvious results for

providing a second distance greater than 25% of the first distance, as opposed to the results obtained for providing a second distance of equal to or less than 25% of the first distance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (703) 305-3233. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd
May 16, 2003

CARL WHITEHEAD, JR.
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